US Army Corps of Engineers

HEADQUARTERS

ENGINEERING & CONSTRUCTION NEWS

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DECEMBER'S THEME:

Engineering & Construction Water Resources Branch

DWIGHT'S NOTES

As the New Year approaches, I reflect on a year full of change in the Corps; in our Nation. When we woke on 1 January 2000 we wondered whether or not our computers would be working that day. (A year later, after 10,000 or more emails, I wish it hadn't). We've spent the most part of this year putting the new Engineering and Construction Division together. We're up and running now (well maybe walking descries it better). E&C News has told you a lot about our plans for the new division.

The coming year holds a lot of promise for E&C in headquarters and throughout our Corps. Sometime this year the 60 E&C team members now located at the Kingman Building will rejoin their compatriots at the GAO Building; and we'll be one again. Our thanks to you for your support and to our leaders, namely MG Van Winkle, MG Hunter and our new Chief, LTG Flowers for deciding to make that so. I believe you will also be pleased with the Corps new Vision document and Campaign Plan, now being developed with a publication date of April 2001. We will concentrate on our technical expertise, on learning, and on being professionals in service to our nation. And we will do it together.

We will also concentrate on restoring the faith our nation has had in the integrity and objectivity of our people and processes. We in the E&C community have an important role to play in this regard. We provide the professional advice and design and construction analysis that often drive decisions in our programs. We must provide honest appraisals of alternatives and embrace partnering and other collaborative approaches if the Corps is to remain relevant and trustworthy. Live the Army Values: "Loyalty, Duty, Respect, Selfless Service, Honor, Integrity, and Personal Courage" and you will know the way.

The theme for this issue is "Engineering and Construction -- Water Resources Branch". This is the fifth of six issues addressing the reorganized Engineering and Construction Division. The new Water Resources Branch covers a wide range of functions that affect our total mission. Earl Eiker and his able team provide champion the hydraulics and hydrology and geotechnical and materials design capabilities in the Corps. They also represent the Corps of Engineers on the Columbia River Treaty Engineering Board with Robert Bank being the Secretary of that International Board. Other important areas handled by the branch include surveying and mapping and emergency support in time of natural disasters. Please see more in Earl's article below.

DWIGHT'S NOTES (CONTINUED)

Earl, as you know is one of several E&C employees who will be retiring from the Corps early next year. In addition to Earl; Pete Juhle, Water Resources Branch; Donna Kuroda, Technical Policy Branch; Robert Wong, Infrastructure Branch and Jack Bickley, Technology Integration Branch, will join the list of former Corps employees. These great technical leaders have made lasting contributions to the Corps, the Army and the Nation. We'll also miss a good friend and top executive talent when John D'Aniello, Deputy Director, Civil Works departs the Corps early January. We must hold them all in esteem and keep them in our hearts and prayers.

So the New Year will also bring some new faces to headquarters and to E&C in particular, as we fill each of these vacant positions. As the vacancy announcements come out for them, please place your sights on them and encourage the best in your organizations to do so as well. The Corps needs its top-notch talent in our headquarters to carry the professional torch and to keep the Castle shining.

As we enter the holiday season, I wish each of you and your families a Happy Holidays and a Prosperous New Year. In the coming year, the new Administration, the new Congress and our new Chief, will lead our Corps and our Nation to new heights. Get some rest during the holidays and prepare yourself for the exhilarating climb ahead.

Essayons,
Dwight

(Editors' note: If you want to share your thoughts with our readers regarding Dwight's Notes send an email to the E&C News editor (charles.pearre@usace.army.mil). A synopsis of your comments will be published in the next issue.)

ARTICLES

THIS PUBLICATION WILL BE ISSUED ON A MONTHLY BASIS AND DISTRIBUTED BY E-MAIL AND POSTED ON THE INTERNET AT HTTP://WWW.USACE.ARMY.MIL/INET/FUNCTIONS/CW/CECWE/NOTES. IF YOU WOULD LIKE TO CONTRIBUTE ARTICLES OR HAVE SUGGESTIONS FOR FUTURE ARTICLES, PLEASE CONTACT CHARLES PEARRE, CECW-EP, 703-761-7343.

Engineering & Construction
Water Resources Branch

WATER RESOURCES BRANCH, ENGINEERING AND CONSTRUCTION DIVISION

This month's feature is on the Water Resources Branch. The Water Resources Branch consists of two teams - the Watershed Team, and the Site Development Team, with an initial staffing of 11 civil, hydraulic and coastal engineers. The Branch Chief is Earl Eiker; the Watershed Team Leader is Dr. Ming Tseng; and the Site Development Team Leader is Art Walz.

We consider ourselves to be at the "foundation" of any USACE engineering and construction project, Civil or Military. For a water resources project, hydraulics and hydrology are the underlying concepts upon which the project evolves. For a structure, the foundation is based on the geotechnical and materials design. And no project can be designed without surveying and mapping upon which to do project layout. These are but three of the primary Branch roles, and we do much, much more. And no, despite the fact that we are combining the water and soil functions, we will not be known at the "mud" branch!

Our basic functions are development of policies and technical guidance for the military and civil works programs related to watersheds, site development and surveying and mapping. This includes requirements for hydraulics and hydrology; coastal and ice engineering; dredging; watershed management and water control; site exploration and drainage; soils and foundations; transportation and sanitary engineering; firing ranges; navigation; hydropower; and gate operating systems.

We are also proponent for systems including: Sounding Hydrographic Operational Airborne Lidar Survey (SHOALS); programs developed as part of Computer Applications in Geotechnical Engineering (CAGE); the Corps Water Management System (CWMS); and programs for engineering of pile foundations. We provide engineering and administrative support to the Columbia River Treaty Permanent Engineering Board, and the Mississippi River Water Control Management Board. We also head of the executive board of the Global Positioning System Interagency Advisory Council.

We provide policy oversight for non-Federal hydropower programs and coordinate with the Federal Energy Regulatory Commission. We prepare and publish an annual report on flood damages and flood damages prevented by USACE projects. We provide hydrologic and weather consultation and other engineering support to the USACE Operations and Civil Emergency Management Branch. We represent USACE corporately on various interagency and Federal committees, such as the Management Association for Private Photogrammetric Surveying, National Oceanographic and Atmospheric Administration (NOAA), Unites States Geological Survey (USGS), Department of Transportation National DGPS Implementation Team, Global Positioning System Interagency

Advisory Council, the Federal Energy Regulatory Commission. We also represent USACE corporately on the United States Society on Dams (USSD, formerly USCOLD).

As with all E&C elements, we also provide consulting expertise and technical support to higher authority, government agencies, MSC, the districts and others for the worldwide USACE mission. We coordinate USACE policy with other agencies and non-governmental organizations, and serve as staff technical expert providing support to all HQUSACE elements. In partnership with the R&D and practitioner community, we identify research and technology needs, monitor the execution of the research and facilitates technology transfer activities in our mission areas.

We are also proponents for and provide oversight and technical guidance to USACE Centers of Expertise including the Hydropower Analysis Center, Hydrologic Engineering Center, Materials Testing Center, Transportation Systems, Sanitary Engineering, and Photogrammetric Mapping.

The Branch will be going through some staffing changes as we face the January 2001 retirements of our Branch Chief, Earl Eiker, and Site Development Team Leader Art Walz. Despite the departure of these two long-time leaders of the profession, we are confident that our organizational structure will permit the Branch to remain stalwart proponents for our internal and external customers.

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District of the Month

PORTLAND DISTRICT

Portland District, a civil works district, includes most of the state of Oregon and a bit of southwestern Washington. The District produces 60 percent of the region's hydropower at 12 of the District's 22 multi-purpose projects in the Columbia, Willamette and Rogue river basins. Navigation locks on the Columbia River allow 10 million tons of cargo to traverse the 465-mile-long Columbia-Snake Inland Waterway each year. The District maintains more than 720 miles of navigation channels and harbors. Its projects provide irrigation water and recreational opportunities. Flood damage reduction is provided through a series of levees and dikes, and the only storage dam on the lower Columbia River. District flood reduction projects have cost $1.2 billion and have prevented $20 billion in flood damages.

One of the biggest challenges faced by the District today is helping migratory fish pass the dams safely on the Columbia River. Every aspect of upstream and downstream passage through the dams is being studied and beneficial improvements implemented as quickly as possible. Other challenges lie in the navigation arena, with federal navigation channel improvements, and even maintenance dredging, coming under fire from many directions. Portland District has provided support in the aftermath of such major disasters as floods, volcanoes, earthquakes, hurricanes and oil spills. District employees are ready to respond again.

There is no shortage of work for the Engineering-Construction Division 176-person team. Much of today's work is either directly or indirectly related to regional environmental and fish recovery efforts.

Salmon Fish Passage Structures and Facilities: Juvenile fish passage goals for all Columbia River hydropower projects are to provide 80 percent fish guidance efficiency around the powerhouse turbines and 95 percent passage survival at each dam. District EC staff, in cooperation with numerous other stakeholders, including biologists and other representatives from regional, federal, state, and local agencies, are currently investigating using the concept of surface collection, bypass, and outfalls as one of the potential solutions in meeting these goals. Juvenile migrating salmonids typically travel in the upper portions of the water column. The surface systems are being developed and tested to "skim" both fish and water from the river's surface. Since no dewatering screens are used in this process, inlet structures must be strategically designed and placed for maximum collection efficiency. Bypass channels are designed to carry both fish and water around the powerhouses. High flow outfall structures are designed to let migrating juveniles re-enter the river with the least amount of stress and into the most hydraulically and biologically desirable reaches downstream of the powerhouses. Surface collection is being developed and tested at Portland District's Bonneville, The Dalles, and John Day projects along the Columbia River.

Bonneville Second Powerhouse Juvenile Bypass Improvements and Outfalls: This challenging project involved construction of the longest nonpressurized fish passage pipe known - a 48-inch diameter transport flume, which ends in outfalls two miles downstream, modifications to the fish collection system in the Second Powerhouse, construction of fish monitoring and tagging facilities, and outfalls with footings sunk deep into the floor of the tumultuous Columbia River.

The work inside the powerhouse – a new dewatering facility, supplying add-in water, changing the collection channel configuration, increasing gate slot orifice diameters, all provided additional flow and improved velocities – had to be done while the facility was operating, which meant careful scheduling of construction contract work and of operation and maintenance activities. A major part of the construction work was restricted to the months of December through February to minimize disturbance of migrating salmon and steelhead; so many critical construction activities had to be done during adverse winter weather.

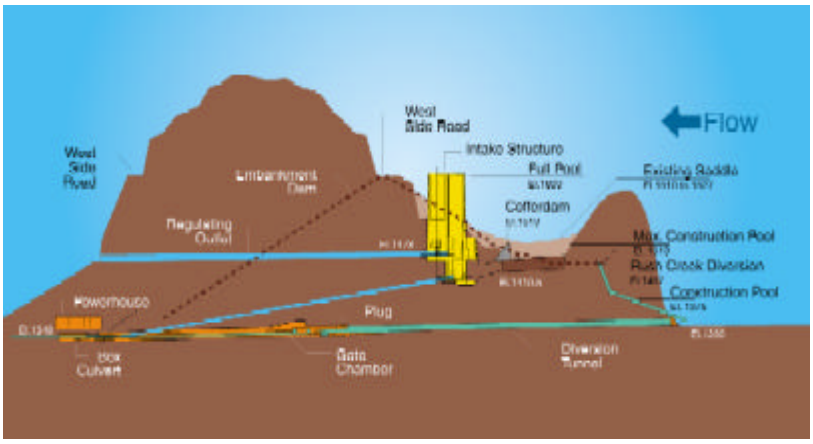
Because the river elevation below the dam can vary by 26 feet in a given year, the outfall structure has both high and low-level release points to allow juvenile fish to re-enter the river at impact velocities of 30 ft/s or less. Each outfall extends about 400 feet from the Washington shore into the river. Large-diameter drilled shaft piers have permanent steel casings with an outside diameter of 10 feet and a wall thickness of 1 inch. The casings were driven a minimum of 8 inches into the bedrock, which is as much as 108 feet below the river bottom. The upper structure consists of post-tensioned concrete double box girders; several up to 180 feet long and weighing 330 tons. All in-water work had to be done during the winter months to protect the fish runs.

The monitoring facility is a state of the art system for detecting passive-integrated-transponder (PIT) tagged fish and selecting them for sampling. A series of dewatering structures route the fish from the large flume into smaller flumes, then into the examination building for hands on evaluation.

Fish Sampling and Monitoring Facility, John Day Lock and Dam: The juvenile fish facility project on the Oregon side of John Day Dam includes a transport flume, dewatering facility and monitoring

building. The flume guides fish from the upriver side of the dam to a dewatering facility, then to the monitoring building and back into the river below the dam. As the juvenile fish pass through the monitoring facility, computerized detectors monitor fish that have been implanted with PIT (passive integrated transponder) tags, providing passage data for those who are trying to solve the fish recovery puzzle.

This facility, which began operating in 1998, increases the amount of knowledge on juvenile fish travel time and survival through the Columbia-Snake river system, and supports a variety of other research work applicable to all migrating fish species. The data is used for in-season and long-term management of the river system to improve salmon survival.



Willamette Temperature Control Project: Cougar and Blue River dams in the Willamette Basin, and water withdrawal from low-level outlets, altered the natural temperature cycle of the rivers below the dams. The purpose of the Willamette Temperature Control project is to incorporate the ability to appropriately control outflow temperatures from those dams. Cooler water temperatures in spring and early summer impact the upstream migration of adult anadromous (migratory) fish. Warmer temperatures in late summer and fall reduce juvenile survival by impacting emergence timing. Intake tower modifications and outflow changes are expected to help both anadromous and native fish.
To modify the 289-foot high intake towers, wet-wells with sliding weir gates will be attached to one side of the existing towers. Those gates will allow selective water withdrawals from different temperature strata in the reservoir. Water from the reservoir will be mixed in the wetwell to meet downstream temperature targets.

The abandoned diversion tunnel used during the original dam construction is being reopened and will be used to lower the reservoir at Cougar for access to the construction area, and to regulate outflows during construction. Modifications are required: stabilizing the tunnel, building a gate chamber in the tunnel to regulate outflows, removing the old bulkhead from the intake portal, and mining and blasting the tunnel plug to tap the reservoir. This initial work will cost $10 million and is scheduled to be completed by December 2001. The entire effort at Cougar and Blue River is scheduled to be completed 2007.

Portland District Powerhouse Rehabilitation Programs: In the early ‘80s, the District initiated the first of three powerhouse major rehabilitation programs. The first was at the John Day powerhouse and included main unit breaker modifications, breaker arc chute replacements, partial rewind of five generator units, and the full rewind of additional five generators. All on-site work was completed in December 2000. The second rehabilitation project began in 1993 at the Bonneville First Powerhouse.

The first phase of this program involved the reconfiguration of the 115-kV switchyard, the replacement of existing 115-kV oil-circuit breakers with new SF6 circuit breakers, and the replacement of all the step-up transformers with two new banks of 115 kV transformers and three new banks of 230kV transformers. All work on the first phase was completed in 1996. The second phase, which involves the replacement of the turbine and runners on all ten of the generator units, refurbishment of the governors for each of the units, and the rewind of six of those units commenced in 1995 and is ongoing. Program completion is currently scheduled for FY2008, dependent on funding. The third commenced in 1996 for Units 1-14 at The Dalles powerhouse. Units 15-22, which were installed in the early '70s, were not included as part of this rehabilitation program. This program involves a rewind of nine of the 14 units, new excitation systems for each of the 14 units, potential replacement of the turbine blades on 12 of the 14 units, and refurbishment of the blades on the remaining two units. Generator rewind work is scheduled to be completed in 2003, with the turbine work scheduled for completion in 2011.

Columbia River Channel Improvement Project: Section 101(b)(13) of the Water Resources Development Act of 1999 authorized construction of a project for navigation in the Columbia River Federal Navigation Channel between Oregon and Washington. The District recommended deepening the existing 600-foot-wide, 40-foot-deep navigation channel from -40 feet to -43 feet Columbia River Datum (CRD), from river mile 3 to river mile 106.5 on the Columbia River. Ecosystem restoration for restoring wetland and riparian habitat at Shillapoo Lake is included in the project. Tide-gate retrofits with fish slides for salmonid passage would be installed at selected locations along the lower Columbia River. Connecting channels would be constructed at the upstream end of Walker-Lord and Hump-Fisher Islands to improve fish access to embayment rearing habitat for juvenile salmonids. Environmental mitigation features will be made on a total of 740 acres of land along the Columbia River. In the Willamette River, the channel would be deepened from river mile 0 to river mile 11.6. The Willamette River portion of the project will be deferred until the completion of the remediation investigation and remediation decisions related to contaminated sediments in the Portland Harbor.

And to ensure we're doing it right, ISO certified **Quality Management System:** The drive to produce quality products, achieve customer satisfaction, assure management involvement, and continuously improve business processes have been focal points for the Corps for many years. To assure the Corps is considering and implement the most efficient management techniques, Headquarters initiated a pilot program called ISO 9000 in sprint 1995.

Four Corps Districts, including Portland, were selected to participate to test the concept and application of ISO 9000 standards and certification. Portland certified its planning and engineering components to ISO 9001 in August 1997. In 2000, its ISO registration scope was expanded to include construction management in its certification.

By establishing, operating and appraising a quality management system that complies with ISO 9000 standards, Portland has developed a framework for a reliable approach to quality management. They've established the opportunity for consistency, clarified our business processes, and tested our systems via a third party against a set of internationally recognized quality standards.

For more information about Portland District, visit its website at www.nwp.usace.army.mil.

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Update

PARTNERING MEETING WITH ACEC

On 28 November 2000, HQUSACE staff held a very successful partnering meeting with the American Consulting Engineers Council (ACEC). The minutes are available on the Civil Works Engineering and Construction homepage at http://www.usace.army.mil/inet/functions/cw/cecwe/minutes28nov.pdf The discussion topics included:

USACE leadership and organization changes
Review of major programs (Civil Works, Military and Environmental)
Support for Others policy
ACEC Federal Markets Conference (12 March 2001)
USACE technical capability
Updated USACE/ACEC partnering agreement
Various A-E contracting topics (small business set-asides, website, revision of SF's 254/255 and training course)

We will be staffing the updated partnering agreement soon and are planning a signing ceremony between the Chief of Engineers and the ACEC President in early 2001. We will distribute the updated agreement when it is signed.
We encourage the MSC's and districts to continue their regional and local partnerships with ACEC. We would appreciate receiving the minutes of your meetings.

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WIRE ROPE FAILURE AT RED ROCK DAM

Red Rock Dam is a US Army Corps of Engineers multi-purpose dam that provides flood control and recreation for Red Rock Lake in Marion County, Iowa USA. The Corps of Engineers Rock Island District designed, built and operates and maintains the dam. Construction of Red Rock Dam was completed in 1969. The primary purpose of the dam is to reduce flood damage along the Des Moines River below the dam as well as along the Mississippi River further downstream. The dam is 1730 meters long and 33.5 meters tall. The earthen segments make up most of the dam, the concrete spillway structure contains 5 tainter (radial) gates, each 12.5 meters wide and 14 meters high and 14 hydraulically operated sluice gates, each being 1.5 meters wide and 2.8 meters high. The tainter gates are high outflow gates used only during high water conditions. Each gate is operated by an electric motor hoist and has 4 wire ropes on each side of the gate.

A number of record conditions happened in mid July 1993. At that time record high lake level occurred on July 13, 1993, the highest inflow of water into Lake Red Rock was recorded at 3820 m^3/s on July 12, 1993 and the highest outflow of water through the control structure was 2956 m^3/s on July 15, 1993. Between the period of 18 and 22, July 1993 several tainter gate wire ropes failed from a combination of corrosion and fatigue. The wire rope failures prevented operation of two gates and

concerns were raised that other wire ropes may fail preventing the operation of other gates at this critical time.

To maintain operation of the remaining gates, Rock Island District personnel contracted to have wide flange beams welded to the skin plate of the gate to transfer the gate weight to the gate piers and remove the load from the wire ropes. This enabled two gates to be held in the full open position. The installation of these support beams was completed on July 25, 1993 and the beams remained in place until the pool level started to drop. The beams were removed on August 6, 1993.

After the emergency was over the Rock Island District contracted to have all the wire ropes replaced. They also contracted with the US Army Corps of Engineers Construction Engineering Research Laboratory (CERL) and with a private metallurgy lab to determine the cause of the failure.

Two independent investigations were performed to determine the cause of the failure. The CERL Materials Lab observed that all the failures occurred near the gate connections. The lab concluded, "the corrosion-roughened wire surfaces initiated fatigue cracks which propagated flat across the wires. After several wires failed due to corrosion fatigue, the remaining wires failed in a ductile manner due to tensile overload." The second laboratory contracted by the Rock Island District was the Metallurgical Laboratory, Inc in Davenport Iowa. The lab tested samples of the existing ropes for tensile strength. These ropes were reportedly not as severely corroded as the ropes that had failed. The average strength of the rope was found to be 33 metric tons, which still yielded an adequate safety factor of 4. The lab next performed a x-ray analysis to determine the presence of chemical ions that could accelerate corrosion, and the ends of the wires in these locations were examined with a Scanning Electron Microscope. The lab concluded, "the main cause of failure is due to the corrosion-erosion phenomena". Rust forms and is removed by abrasion exposing the surface to rust again. This continues until wires fracture from high bending stresses or tensile stresses. The lab noted that the failures were typically about 260mm from the gate connection. The lab also noted the presence of paint overspray on the ropes. The paint was described to have a vinyl chloride base. The lab noted that chlorides and the chlorine calcium carbonate in the water can attack the unprotected surfaces of the wires and cause a more rapid corrosion of the wires.

In addition to these analyses, an additional report stated that severe vortexes upstream of the gates were observed at the ends of the gates when partially opened causing the ropes to vibrate. This vibration caused rubbing against the gate that could have resulted in abrasive wear and fatigue. It was also reported that the vortexes caused continuous lifting and dropping of the gates. This situation together with the deteriorated condition of the wire ropes most likely caused the ropes to become overloaded and the initiated failure scenario. There was also debris hitting the ropes and getting trapped between the ropes and the gate's skinplate.

To again achieve full operational capability of the spillway, the Corps contracted to have the wire rope assemblies on all 5 gates replaced. The replacement wire ropes were specified to be 26mm diameter, 6x30 flattened strand with an independent wire rope core (IWRC). It was specified to be extra-improved plow steel; preformed, pre-stretched and right lang lay. Specifying right lang lay and extra-improved plow steel are improvements to the existing ropes which were improved plow steel and regular lay. The extra-improved plow steel has 10% greater strength and the lang lay, provides greater fatigue resistance and better resistance to abrasion than other types of rope construction. Bending of lang lay ropes results in less axial bending of the outer wires and greater torsional flexure. The strength of the original wire rope was not an issue since the original safety factor was greater than 4.

The replacement wire rope assemblies included the drum socket (ferrule), wire rope, gate rope socket, zinc-poured socketing. The ropes were proof load tested to 18 metric tons, the drum rope sockets and the gate rope sockets were then subjected to a dye penetrant test. After installation the contractor equally tensioned the ropes using a deflection-type tension indicator. After the tension testing was completed the contractor field lubricated the wire rope. The lubricant that was used was recommended by the manufacturer of the rope and was suitable for both underwater and atmospheric exposures. Keeper bars were also welded to the sides of the wearing plates to keep the ropes centered on the wearing plates and protected from damage.

As a result of the Red Rock Dam wire rope failures a number of lessons were learned about rope material, rope construction and inspection, maintenance and retirement practices. The Corps of Engineers decided to produce an engineering manual, EM 1110-2-3200, "Wire Rope Selection Criteria for Gate-Operating Devices" that documented lessons learned and presented state-of-the-art technology from commercial and industrial sources and information from existing Corps structures. Its purpose was to optimize the service life of wire rope and to reduce the likelihood of future failures. Also included in this document are design and selection guidance and field acceptance and installation recommendations.

Wire rope gate operating devices are the most common hoist used by the Corps of Engineers at its Civil Works projects. These hoists have provided many years of reliable service. Sometimes this reliability provides a false sense of security and in general, as operating budgets are reduced, decisions are sometimes made (not the case at Red Rock Dam) to reduce or eliminate long established inspection and maintenance practices. Especially as projects age, it's very important to have an established and effective inspection and maintenance program. The frequency of inspection at Corps facilities varies depending on usage and environment. Some projects need to be inspected monthly and others can be extended to yearly inspections. The frequency of inspection can vary from project to project but the thoroughness of the inspection should not. It's important to inspect every inch of the rope. The location where the rope is attached to the gate is often the most difficult area to inspect but is probably the most critical area. Visual inspections can reveal many problems but are limited to what can be seen on the rope's exterior. Sometimes corrosion of internal wire can be hidden. The results of the inspections should be recorded to identify trends that could identify problems before a failure occurs. The following are some items that should checked during an inspection.

- Diameter reduction – Could be an indicator of what's happening internally. A sudden diameter decrease indicates core deterioration and need for replacement.
- Rope stretch – Can be reduced by pre-stretching. Wear and fatigue over an extended period of time contribute to a small amount of stretch. Accelerated stretch indicates that replacement is required.
- Abrasion – Most standards require rope be replaced when the outer wire wear exceeds 1/3 of original wire diameter.
- Broken wires – Broken wires between the rope strands indicates a very serious condition. When two or more such fractures are found, the rope should be replaced and the cause of the breakage determined.
- Corrosion – Most common form of rope degradation on hydraulic structures. Pitting is an indication that the rope needs to be replaced.
- Peening – Continuous pounding because of vibration can cause peening. Eventually cracking and breaking of wires will require replacement.

- Cracked, bent, worn or broken fittings – If more than one wire failed near the fitting then the rope assembly should be replaced.
- Worn sheaves and/or drum grooves – Measurements should be taken of the groove dimensions. This could require replacement of the drum, sheaves and rope. Check rotating elements for binding.

Proper operation and maintenance of the gate operating machinery can maximize the life of the wire rope. Operation of the gate should be discontinued if the entire gate or one side of the gate jams. Unequally tensioned ropes or debris trapped in the ropes are also situations that can damage ropes and should be cause to postpone gate operation until maintenance is performed. One of the more important maintenance procedures is to periodically clean and field lubricating wire rope. A lubrication program will reduce rope wear and corrosion. Cleaning is needed to remove foreign material and old lubricant from valleys between the strands and from the spaces between the outer wires. The lubricant needs to be selected for the specific application and for the environment. Lubrication systems are commercially available that in one application can clean the rope and at the same time uniformly apply fresh lubricant to the cleaned surface and injected into the rope's core. This process forces out trapped moisture. Trapped moisture can produce corrosion cells. Ironically, corrosion is often less severe for a non-lubricated rope than for one that is infrequently lubricated. Infrequent lubrication causes areas on the rope's surface to have no lubricant for extended periods of time. In moist atmospheres this produces corrosion cells that can cause deep pitting. If the rope is not lubricated the corrosion tends to be shallow and over a large area.

Another maintenance consideration is deciding when to retire the rope. The above referenced Corps manual recommends that wire rope used for gate operating devices can be assumed to have a maximum service life of 20 years. This provides a base line to follow but actual project records will dictate when a shorter service life is required.

Finally, any proposed change to the project's operating procedures should be thoroughly evaluated by operation's personnel before implementation to determine the consequences. Red Rock Dam's original operating procedure was changed which may have contributed to the wire rope failure. The original operation plan was to maintain pool level at or below the spillway crest. The entire gate would therefore have been above normal pool elevation. The change allowed the normal pool level to be 1.5 meters above the spillway's crest. Since the original design intent was to have the gates in the dry bulkhead slots in the concrete were not provided. This made inspection of the bottom 1.5 meters of the gate very difficult.

One of the many challenges that the Corps of Engineers and many other private and public organizations face is the need to operate and maintain aging projects with decreasing operation and maintenance (O&M) budgets. Pressure is put on the projects to reduce O&M personnel and maintain project reliability and a strong dam safety program.

The wire rope failure at Red Rock Dam illustrated how a historically trouble-free and relatively small feature of a dam, small in size and monetary value as compared to other project features, can have a major impact on the dams ability to control flooding.

Having a successful dam safety program requires that project owners and operators have an effective inspection and maintenance program with qualified and capable personnel executing that program and operating the project in accordance with the O&M and water control manuals. The wire rope failure at

Red Rock dam and similar incidents at other projects emphasize the need to inspect and maintain all features even the historically trouble-free or seemingly insignificant features of a dam. Finally, it is extremely important that any change to the water control plan be thoroughly coordinated with operation's personnel, to avoid unintended impacts on project features.

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ARCHITECT-ENGINEER RESPONSIBILITY MANAGEMENT PROGRAM (AERMP)

We have received and analyzed the FY00 AERMP reports from all MSC's and Centers, which are required by Chapter 7 of EP 715-1-7, Architect-Engineer Contracting. The following observations are made:

1. The total amount of A-E liability settlements received in FY00 was only $140,000, the least ever reported. The annual average recovery over the last 10 years has been about $1,500,000. It is difficult to say whether this is good news or bad news. Are we getting much higher quality work from A-E firms? Are we not paying enough attention to A-E liability? Does this reflect a reduction in our traditional A-E design work such as MILCON? Have our project budgets been cut so much that we afford to pursue A-E responsibility? In any case, we encourage you to review your AERMP to ensure that you have a regular process of reviewing design deficiencies and holding A-E's financially accountable for the quality of their work. We owe this to our customers!

2. The final liability settlements negotiated with the A-E firms were about 45% of the original computed damages, which is in line with the historical average.

3. Based on the data received from five districts on settled cases in FY99, about 23 cents in investigation and recovery (I&R) costs were spent for each dollar of A-E damages (excluding I&R costs) pursued. This is much greater than in FY98 and FY99, where the average I&R cost was about 5 cents per dollar of damages. This notable increase is very likely due to the small number of cases settled. Remember that reasonable I&R costs are part of the assessable damages.

4. The backlog of liability cases (and associated dollars) carried over into FY01 (130 cases totaling $14,700,000, including one case of $8,733,000) is significantly less than carried over into FY00 (208 cases totaling $16,400,000) and into FY99 (265 cases totaling $21,900,000). This is an encouraging trend, since we have an important responsibility to our customers to pursue A-E liability cases in a very timely manner.

5. A few districts are reporting all design deficiency modifications as A-E liability cases. An A-E liability case is only established if all three of the following conditions are present and pursuing recovery is advantageous to the Government:

   a. The A-E firm made an error or omission.

   b. The error or omission resulted from the firm's negligence or breach of contract. Negligence is the failure to meet the standard of reasonable care, skill and diligence that one in the A-E profession would ordinarily exercise under similar circumstances. Not all errors or omissions are negligence.

c. The Government suffered damages as a result of the error or omission.

Please review the guidance in EP 715-1-7, paragraph 7-7.d through 7-7.h. A liability case is initiated when the Government sends a letter of intent to the A-E firm as defined in paragraph 7-7.h.

Based on the FY00 reports, MSC's and districts seem to be very aware of the requirements of the AERMP although actual recoveries were very low and I&R costs relatively high. We will closely examine next year's reports to see if these trends have continued and decide on any needed actions. The FY01 MSC AERMP reports are due to CECW-ETE by 30 November 2001. Districts are required to report quarterly to their MSC on the progress of each case.

POC: DON EVICK, CECW-ETE, 202-761-4227

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FT. RUCKER/CORPS OF ENGINEERS FORM PARTNERSHIP TO UPGRADE HISTORIC DAM

View of new auxiliary spillway and collection ditch with the lakebed to the right. The original service spillway is in the foreground. (Photo by Tim Shows)

It has been 6 long years since the soldiers of Ft. Rucker, their families and the residents of southeast Alabama have enjoyed the water resources known as Lake Tholocco. This situation is now being remedied through the efforts of the Ft. Rucker Command with support of the Mobile District Corps of Engineers. The Lake Tholocco Dam is located on Claybank Creek in the Choctawhatchee-Pea River Basin on the West Side of the Fort Rucker Military Reservation near Dothan in southeast Alabama. Lake Tholocco Dam was constructed in the 1930's as a Federal Works Progress Administration project. The 680 acre lake provides outdoor recreational opportunities including fishing, swimming, boating, and skiing for Fort Rucker personnel as well as civilians throughout the area. In addition, the lake provided additional training opportunities for military personnel at Ft. Rucker.

Requirements for training installations to support military activity during World War II led to establishment of Camp Rucker on land obtained from the Department of Agriculture. Lake Tholocco was within the lands the US Army developed into present day Fort Rucker and the US Army Aviation Center. Since World War II, Lake Tholocco provided recreational opportunities and training areas contributing to the overall mission of Fort Rucker. The Lake Tholocco Dam consists of a 2400 linear foot earthen embankment with a crest width of 12 feet and heights ranging up to 45 feet. The service spillway is a concrete fixed crest ogee shaped with the crest some 50 feet long. The design criteria used by the Works Progress Administration did not meet current criteria due to inadequate hydraulic capacity as identified in the 1979 Phase I Inspection report under the National Dam Safety Program. Since the 1930's construction, the earthen "emergency" spillway was regularly overtopped and severe erosion (head cutting) had progressed from the outfall of the emergency spillway into Claybank Creek.

During 16-18 March 1990, a significant flood resulted in failure of the emergency spillway. A letter report prepared by Mobile District in June 1990 recommended raising the height of the dam and increasing the service spillway capacity. Without funding to implement the letter report

recommendations, Fort Rucker acted to repair the dam to restore the recreational facilities. US Army Combat Heavy Engineers repaired the breach in the emergency spillway back to the pre-March 1990 flood condition. Tropical Storm Alberto during 1-4 July 1994 caused widespread flooding in southeast Alabama and southwest Georgia. The Lake Tholocco emergency spillway failed in a manner similar to the March 1990 flood. At the request of the Fort Rucker Director of Public Works, Mobile District designed repairs to the dam, preparing plans and specifications to accommodate one-half the Probable Maximum Flood (PMF) increasing the storage and spillway capacity, and raising, widening and armoring the emergency spillway. Since the 1994 flood, Fort Rucker pursued Army Maintenance and Operations and Military Construction funding to repair the dam and re-establish the Quality of Life facilities surrounding the lake. However, the costs required to complete the upgrade far exceeded funds available to Ft. Rucker.

In the Spring of 1999, MG Anthony Jones, Commanding General of Ft. Rucker, tasked the Mobile District to propose a less costly design alternative that would meet the new design criteria and require minimal maintenance. With the invaluable assistance of COL Kenneth Clow, Director of Public Works, Mr. Tom Sizemore, Deputy Director of Public Works and Ron Leatherwood, Chief of the O&M Division of the DPW, an alternative design was developed for consideration. That design did not modify the existing service spillway, but installed an auxiliary spillway with a collection channel in the embankment adjacent to that service spillway. The auxiliary spillway would be of sufficient capacity to handle maximum flood flows, thereby eliminating the need for an emergency spillway. The armored channel would discharge waters directly in Claybank Creek, thus eliminating the potential for erosion. Several types of surface coverings were compared and Roller Compacted Concrete placed in 1-foot thick steps was deemed to be the most cost effective. The Ft. Rucker Commander and plans approved the alternative plan and specifications were developed. Since funding was still a primary issue, the Command requested that the project be divided into several phases that could be awarded over multiple years, yet stand alone upon completion.

The first phase contract was awarded in the spring of 1999 to Overstreet Electric Company. It provided for the replacement of the sluice gate and motor assembly at the existing concrete service spillway and constructed a new walkway over the spillway crest. The second phase contract provided for the construction of the new auxiliary spillway. Since the selected surfacing covering for the spillway and channel was roller compacted concrete, the inclusion of all that type of work in a single contract was most necessary to preclude the requirement of remobilizing batch plant operations. The Mobile District Construction Area Office had an indefinite delivery order contract with Bill Harbert Construction to support Ft. Rucker and the remaining amount available for use under that contract was just enough to perform this work. A task order was negotiated by Jim Hannon of the Mobile District and Greg Peterson of Bill Harbert Construction in late September 1999 after the Command staff worked very hard to secure the funding. At 1,550 feet in length, this record setting project has the longest RCC spillway in the eastern United States and one of the longest in the country. The RCC is installed in 1-foot thick steps with width varying from 8 to 12 feet on the 1 vertical to 3 horizontal slopes on the collector ditch and 1 vertical to 6 horizontal on the spillway slope. The installation of the RCC proceeded very well with Terry Cromer of the Ft. Rucker Resident Office providing construction oversight with great support from the Ft. Rucker DPW staff as needed. The elevation of the auxiliary spillway is set to discharge waters from a rainfall event of every one to two years. The spillway slope is relatively flat to lower discharge velocities and maintain the floodwater in the collection ditch. A trench filled with large diameter riprap has been placed immediately downstream of the collector ditch should the estimated tailwater levels not be realized at the time of a given event. If the area beyond the

ditch is exposed to erosional velocities, the riprap will prevent damage to the backside of the ditch and ultimately to the spillway itself.

The Ft. Rucker Command tasked the Mobile District with preparing the final phase 3 contract in FY 2000 for the remainder of the work. Clearing the reservoir of all trees and loose brush was a prime task of the contract. Other tasks included installing steel sheetpile coffercell drop structures capped with concrete at the end of the collector ditch, filling the breached areas of the old emergency spillway and extending the dam section across that area to high ground. This contract was awarded to Larsen Construction Services and the work is scheduled for completion in the summer of 2001. The coffercells step down in four foot increments to dissipate the flood water discharge energy before it enters Claybank Creek. The breached area will be filled and the large area behind the dam section will be regraded and grassed for surface drainage.

The successful progression of this project represents what can be achieved with cooperation and partnership of varying organizations within the US Army in pursuit of a common goal. The reestablishment of Lake Tholocco will indeed provide additional training opportunities and the added quality of life to the soldiers stationed at Ft. Rucker, their families and the surrounding community that we all are dedicated to serve.

POC: MICHAEL MCKOWN, CESAM-EN-GG, 334-690-2681

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FEDERAL & STATE AGENCIES LEAD RIO GRANDE WATER OPERATIONS STUDY

Upper Rio Grande Basin
Water Operations Review and EIS

Management of the Rio Grande involves many agencies, each with its own mission and set of rules and guidelines. Three of the agencies have recognized the need for development of an integrated plan for water operations at their existing facilities in the upper Rio Grande basin. The joint lead agencies for this effort: the U.S. Army Corps of Engineers (Albuquerque District), the U.S. Bureau of Reclamation, and the New Mexico Interstate Stream Commission–recently agreed to examine what they can do under existing authorities to improve how water is stored and delivered.

This study, called the Upper Rio Grande Basin Water Operations Review, officially began with the publication of a Notice of Intent in the Federal Register on March 7, 2000. The review will provide the basis for an environmental impact statement (EIS) that will examine selected water operations activities in the Rio Grande basin above Fort Quitman, Texas, that are within the joint lead agencies' existing authorities. The institutions encountered by the Rio Grande as it flows from its headwaters in Colorado, include two countries, three states, 25 Indian Pueblos and Tribes, two rapidly growing major metropolitan areas, 20 counties, as many local governments and a myriad of acequias and irrigation districts. Associated directly with storing and releasing river water in the upper Rio Grande basin are an international treaty with Mexico, an interstate compact among Colorado, New Mexico and Texas, more than a dozen federal water project authorizations, water laws of the three states, and state and tribal water quality standards.

A major charge of the Corps of Engineers is flood loss reduction and sediment control. The Bureau of Reclamation primarily manages water delivery to private, municipal, and industrial users, and the

Interstate Stream Commission monitors compact deliveries and San Juan-Chama project water storage and releases.

What the Review Will Do: The Review will determine how the lead agencies will use their existing water operations authorities to:

- Help meet water needs of all users, including the need for conservation of endangered species.
- Meet downstream delivery requirements mandated by the Rio Grande Compact and the international treaty with Mexico.
- Provide flood protection and sediment control.
- Assure safe dam operations.
- Support compliance with local, state, tribal, and federal water quality regulations.
- Identify flexibility for operation of federal reservoirs and facilities within existing authorities.
- Assist managing agencies to operate these facilities more efficiently as an integrated system.
- Improve decision-making processes on water operations through better interagency communications and more public input.
- Support compliance by the joint lead agencies with the National Environmental Policy Act, the Endangered Species Act, and all other applicable laws and regulations.

As required by the National Environmental Policy Act (NEPA), an interdisciplinary team of resource specialists will identify and analyze alternative water operations plans and prepare the EIS. Technical teams have been organized to support the interdisciplinary team. Ms. Gail Stockton, Study Manger for the Albuquerque District, has been a key figure in the team development and is active in coordinating management issues with the other agencies involved. The technical teams, with help from the public during scoping meetings, will identify resources to be studied, determine the indicators and the methods to be used for analyzing impacts on their resources, and recommend the alternative water operations to be considered. Tools such as the newly developed Upper Rio Grande Water Operations Model will be used to assist in the analysis. This computer model, developed by a multi-agency group of water resource specialists working at the Albuquerque District office, runs in RiverWare™ software.

The Water Operations Review Technical Teams will initially focus on the following resources. As additional areas of concern and issues are identified during and following public input, this list may be expanded.

Aquatic Systems: The riverine aquatic habitat has deteriorated due to changes in management and in the physical system of the river and floodplain. These include increased diversions, flood control, sediment control, discharge management, urban development, invasion of nonnative plants, and reduced healthy riparian-riverine interaction. Reservoir aquatic habitat is subjected to frequent changes in pool elevation, limiting the ability of aquatic species to effectively use available habitat. Some of the effects on aquatic systems could be influenced by changes in the discretionary actions to manage water operations on the Rio Grande and Rio Chama. Recent studies have focused primarily on the endangered Rio Grande silvery minnow and strongly indicate that unless significant changes are made, the species could disappear from the Rio Grande system in the near future.

Riparian and Wetland Ecosystems: The riparian zone of a river is the area next to the channel where vegetation may be influenced by water tables or flooding. Historically, riparian vegetation along the middle Rio Grande consisted of scattered and often mixed stands of cottonwood trees, willow shrubs, and salt grass meadows. Where groundwater was close to the surface, ponds, marshes and shrub

wetlands also occurred. The extent and character of bosque and wetland communities have dramatically changed over the past 100 years due to urban, agricultural, and water resource development, and the spread of exotic species such as Russian olive and salt cedar. In addition to its regionally unique and valuable wildlife habitat, the riparian community functions to stabilize banks, attenuate flood flows, and remove and trap water-borne sediment and nutrients.

River Geomorphology, Sedimentation and Mechanics: The operation of federal flood control and water delivery facilities has altered the hydrology and geomorphology (land forms) of the upper Rio Grande basin by reducing peak flows and the amount of sediment delivered downstream. Peak floods and sediment maintain the river channel, sustain riparian communities, and provide aquatic habitat for fish and other wildlife. Changes in river channel morphology in some reaches, including channel shape, sediment delivery, bed material composition, and interaction between the river and the floodplain have occurred, in part due to the operation of federal facilities. Flood control downstream from federal facilities has limited the amount of bank erosion and flood damage in various reaches. Sustaining a more complex and dynamic channel morphology, while providing adequate flood protection and water delivery, is key to the successful future operation of federal flood and water delivery facilities.

Water Quality: Surface water quality in the Rio Grande and its tributaries is variable both in location and time. It is affected by complex interactions between natural factors such as climate and hydrogeologic setting, and by human influences such as land use and water operations. Due to the dynamic interaction between water quality and river flow, changes in current water operations could change surface water quality. Determining and documenting current surface water quality conditions for the Rio Grande and several of its tributaries along with changes that would occur in response to proposed modifications in water operations will be reviewed and evaluated.

Cultural Resources: The Rio Grande has been a focus of human occupation for thousands of years. More than 5,000 historic properties and archaeological sites have been identified on less than 20 percent of the area adjacent to the river. The river and its surrounding landscape have been and continue to be central to the traditional cultural identity of its diverse communities. The region contributes immeasurably to the cultural heritage of the state and nation. Changes to the flow regime of the river have the potential to dramatically affect historic resources and cultural practices that are important to all who live along the Rio Grande.

Land Use, Socioeconomic, and Environmental Justice: The Rio Grande basin study area includes a population of over 1.5 million, the majority of which reside in New Mexico. Population in New Mexico and Texas is growing rapidly, whereas the basin population in Colorado is stable. High unemployment in the rural areas and rapid growth in the urban areas characterize it, with per capita income below the national average, especially in the urban areas. Municipal and industrial water demands have been growing steadily, as a result of increased urbanization. There are significant differences in agricultural production throughout the region, ranging from potatoes, barley, and wheat in Colorado; alfalfa and pasture in the middle Rio Grande; to cotton, alfalfa, pecans, and chile in the lower part of the basin. The Rio Grande provides water used for hydropower generation at Elephant Butte, El Vado, and Abiquiu.

Recreation: The upper Rio Grande basin is home to many public recreation facilities managed by several different federal and state agencies, including the state parks El Vado, Heron, Rio Grande, Elephant Butte, Caballo Lake, Percha Dam and Leasburg Dam; Bureau of Land Management lands

including Wild Rivers and Orilla Verde; US Fish and Wildlife Service National Wildlife Refuges; and Abiquiu Lake and Cochiti Lake reservoirs managed by the US Army Corps of Engineers. These facilities provide the majority of the water-based recreation for the entire state of New Mexico, including boating, fishing, swimming, skiing, windsurfing, and white water rafting. The Rio Grande and its adjacent lands are major resources for recreational opportunities including fishing, bird watching, bicycling, hiking, horseback riding, picnicking, playgrounds, hunting, camping and sightseeing**.**

The final Environmental Impact Statement is scheduled for completion at the end of 2004. While there will be one EIS document, each lead agency will prepare their own record of decision. The Albuquerque District is excited to be an integral part of this project and anticipates four challenging and rewarding years lie ahead.

POC: DOUG WOLF, CESPA-EC-EH, 505-342-3489

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Dam Safety

INSPECTION, INTERPRETATION AND FOLLOW-UP

The National Dam Safety Program Technical Workshop No .8 - "Inspection, Interpretation and Follow-up" has been scheduled for February 21-23, 2001. It is the 8th workshop in a very successful and highly acclaimed series of technical dam safety training sessions, sponsored by the Interagency Committee on Dams, the National Dam Safety Program and developed through the cooperation of the Federal dam safety agencies and the Association of State Dam Safety Officials.

The workshop will examine the inspection, evaluation and appropriate follow-up actions that should be taken based on the results of the inspections for all types of dams. Since the inspection topic encompasses the most basic component for most dam safety programs, the workshop should be a significant interest to State and Federal dam safety engineers and officials, private engineering consultants, and dam owners. The workshop will feature:

- Recognized experts from private industry, the Corps of Engineers, the Bureau of Reclamation and State Dam safety programs providing insight into how observed deficiencies could effect the integrity of a dam, the seriousness of the deficiencies and the level and urgency of follow-up action.

- Dealing with the more problematic observations such as seepage, failure mode analyses, and the decision on when to monitor and when to act.

- Presentations on innovative and specialized inspection methods and equipment.

- Technical and strategic aspects of implementing the dam inspection follow-up actions.

The workshop is being developed to pick up where the more basic inspection training, such as Reclamation's SEED course leaves off, and provide a higher more advanced level of technical information.

The Seminar will be held at FEMA's National Emergency Training Center (NETC) in Emmitsburg, Maryland, on February 21 - 23, 2001. The sessions will begin at 8:00 a.m. and will conclude at 5:30 p.m. on Days 1 and 2, and at 10:30 AM on Day 3.

To register for the seminar, individuals need to complete the General Admissions Application Short form (75-5a) and return it to the NETC no later than January 22, 2001 (**in block 9(a) - Course Code, write E-274)**. The registration form may be faxed to 301-447-1658 or mailed to National Emergency Training Center, Admissions Office, 16825 South Seton Avenue, Emmitsburg, Maryland 21727. The form and additional information about the seminar are available at http://www.fema.gov/emi/dsts.htm.

POC: CHARLES PEARRE, CECW-EIS, 703-428-7343

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Information

CONCRETE TECHNOLOGY CENTER OF EXPERTISE

The Concrete Technology CX was created to fill the increasing need within the Corps of Engineers to centralize the knowledge of new technology in concrete design and construction. With the personnel reductions in every FOA, many districts can no longer maintain all specialized capabilities and have to acquire outside help in their design and construction of concrete projects. It is essential that all districts be aware of the existence of this CX and use its service to the maximum extent. It will not only be beneficial to the districts but will also serve to preserve corporate knowledge in the Corps. The information about the Concrete Technology CX is located in the Corps web page at the following URL: http://www.usace.army.mil/inet/functions/cw/cecwe/coexpert/newcoe/doe/ctc.htm.

POC: M. K. LEE, CECW-EIV, 703-428-7345

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JOB VACANCIES

Six vacancies are highlighted here for the information of our readers.

FAR EAST DISTRICT VACANCY -- The Far East District has announced a vacancy for a GS-13, Interdisciplinary Engineer position as a Project Manager in their Programs and Project Management Division, Air Force and Support for Other Branch. The vacancy is listed under two announcements, KS01033WW and KS01037WW, which close on 5 January 2001.

The individual will be responsible for the overall management, control, coordination and execution of project processes. Duties include implementing corporate decisions, guidance, laws, regulations, and policy in the establishment and development of a comprehensive reporting and project management tracking system based on the PROMIS and P2 information management systems. The individual negotiates and integrates all district functions (i.e., planning, design, cost engineering, construction, real estate, contracting, etc.), sponsor/customer needs and other agencies' commitments in support of assigned project into a comprehensive management plan. Responsibilities also include integrating Executive/Congressional schedules and criteria and establishing project scope and criteria, schedules and milestones, budgets, dependencies and responsibilities of the participating parties, assumptions and risks, contingencies, and performance measurement criteria. The position coordinates the reporting, scheduling, updating, for engineering projects of considerable scope and complexity as measured by their diversity, geographical area, management demands, technical intricacies, and public issues.

For copy of the announcement and other application information on to http://www.cpol.army.mil and click on "Employment" and then on "Army's Vacancy Announcements". Enter either KS01033WW or KS01037WW in the announcement number block. Resumes and Supplemental Information can be submitted by email to resumix@cpoc.korea.army.mil by following the instructions in the announcement. For additional information on applying for this position contact Monte Howard by email monte.howerd@pof02.usace.army.mil.

HYDROLOGIC ENGINEERING CENTER VACANCIES -- The Hydrologic Engineering Center, located in Davis, California, is recruiting to fill five vacancies. Two positions are for entry through journeyman-level hydraulic engineers (GS-9/12), two are for senior-level hydraulic engineers (GS-13), and one is for an HEC Division Chief (Supervisory, GS-14). Four of the vacancies were announced in the November E&C Newsletter - refer to that issue for more information about these vacancies. The vacancies are:

Hydraulic Engineer GS-9/12: This vacancy is in the Hydrology and Hydraulics Technology Division and supports field applications and software development in the technical subject of river hydraulics.

Hydraulic Engineer GS9/12: This vacancy is in the Water Resource Systems Division and supports investigations and software development work in the area of riverine and wetlands ecosystem restoration.

Hydraulic Engineer GS-13: This vacancy is in the Hydrology and Hydraulics Technology Division and leads activities in hydrologic engineering investigations of particularly difficult circumstances or involving precedent setting methods development or applications. Practical field experience is a priority for this position.

Hydraulic Engineer GS-13: This vacancy is in the Water Resources Systems Division and leads activities in the technical area of reservoir analysis, to include field applications and software development. Practical field experience is a priority for this position.

Supervisory Hydraulic Engineer GS-14: This vacancy is for the Chief, Water Resource Systems Division (WRS). This division was established in FY 2000 and is the successor to the Planning Analysis Division that had previously existed for almost 30 years. WRS is the HEC division that fills the technologic niche between hydrologic engineering and Civil Works planning activities. Besides hydrologic engineering, technical activities in WRS address: plan formulation and evaluation methodology; reservoirs system analysis; system optimization; flood damage analysis; ecosystem restoration; watershed studies; and risk analysis. The division chief leads these activities for the Center, represents HEC with HQUSACE and others on planning analysis matters, and serves as a member of the HEC senior management group that determine policies and practices for the Center.

These positions will be filled through the Western Civilian Personnel Operations Center (WCPOC) located in Ft. Huachuca, AZ. You may submit a resume via Resumix by following the instructions at http://www.wcpoc.army.mil. You may alternatively apply via the Delegated Examination Unit (DEU) procedure, also available at the above Web site. For administrative information and assistance, contact Diane Cuming at HEC. For technical and other job related information, contact the Darryl Davis, Director, HEC or Arlen Feldman, Hydrology and Hydraulics Division Chief, or Mike Burnham,

retiring Water Resource Systems Division Chief. See the Web site at http://www.hec.usace.army.mil for information about HEC.

POC's: Richard F. Schiavoni, CEPOF-ED, 011-822-2270-7437, and Darryl Davis, CEIWR-HEC, 530-756-1104

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Fire Protection Engineer Qualifications

In accordance with Military Handbook 1008, *Fire Protection for Facilities Engineering, Design and Construction*, the services and review of a qualified fire protection engineer are required for major new construction and renovation projects (paragraph 1.5). The Handbook defines the minimum qualifications of a fire protection engineer. Registration as a fire protection engineer is one option, however not all states have a registration process for fire protection engineers. Hence, two other optional qualification approaches are identified.

To reflect the requirements in Military Handbook 1008, we suggest that you use the following language in your Commerce Business Daily announcements when a fire protection engineer is required:

The fire protection engineer shall be a registered professional engineer, having a minimum of 5 years experience dedicated to fire protection engineering, and one of the following (a) a degree in Fire Protection Engineering from an accredited university; (b) passed the National Council of Examiners for Engineering and Surveys (NCEES) fire protection engineering examination; or (c) registration in a engineering discipline related to fire protection engineering.

POC's: Don Evick, CECW-ETE, 202-761-4227, and Bob Diangelo, CECW-ETE, 703-428-7263

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R.C. Byrd Lock and Dam Accident, Russell Justice Case

The Huntington District was recently involved in a lawsuit that was a result of an injury to a deck hand. The cause of the accident was in dispute but the court found that a surge was created when the lower miter gates were opened and that the surge caused mooring lines to break and hit the leg of the deck hand causing serious injury. The surge occurred because a portion of culvert valve control system that limits over-fill and over-empty was not operational at the time of the accident. A pressure transducer had failed and the replacement part had been on order. Judgement went against the Corps because the judge found that a surge occurred and that the towing industry was not notified that a portion of the computer control system was not operating. The judge based his decision primarily on the fact that notice was not given to the towing industry/navigation interests that a piece of equipment, in this case the programmable logic controller, was not working.

This incident underscores the necessity to inform the towing industry/navigation interests when a piece of equipment, that affects or that could potentially affect the operation of a lock, is not operational.

POC: Dan Casapulla, CECW-ETE, 703-428-7258

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Training

OVERVIEW OF ENVIRONMENTAL REQUIREMENTS OF CORPS CONSTRUCTION PROJECTS

Spaces are available in Session 01-01, Overview Of Environmental Requirements Of Corps Construction Projects, PROSPECT Course #427, to be held in Omaha, Nebraska, 7 and 8 March 2001. To obtain a space in this workshop, you should contact your Training Coordinator and the PROSPECT Registrar at 256-895-7425 or 7421. If you have questions about the course you should contact Ms. Joy Rodriguez, 256-895-7448, or email at Rebecca.J.Rodriguez@usace.army.mil.

This course provides an overview of environmental regulations applicable to construction activities conducted under the military, civil works, and HTRW programs. An outline of the various requirements under the major environmental regulations will be reviewed with specific focus on the recently revised Environmental Protection CEGS 01355. This workshop will cover the content of the specification from an engineering design perspective and integrate this for implementation in the field.

The workshop has been developed by in-house engineering and construction USACE staff and focuses on environmental regulations that impact construction projects. The workshop focuses on environmental permit issues, customer partnering, affirmative procurement, waste management issues, including P2/waste minimization, emergency planning and community right to know requirements, spill control, pest management and water related issues such as the NPDES program and associated storm water regulations. Clean Air Act requirements related to particulate issues (fugitive dust) will also be addressed. Cultural and natural resources, including endangered and threatened species as they relate to the implementation of construction activities will also be discussed.

This workshop has been developed for an audience primarily consisting of construction representatives as well as designers that edit the CEGS 01355 Environment Protection.

POC'S: TERRY WILFORD, CECW-ETC, 703-428-7284

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Open Discussion and Comments

No Items Submitted for this Issue.
(Editors' note: If you want to share your thoughts with our readers regarding a subject of general interest, send an email to the E&C News editor at charles.pearre@usace.army.mil. A synopsis of your comments will be published next time).

Editors' Notes

SUBSCRIBE TO ECNEWS

Engineering and Construction News uses a subscription list on the Corps List Server. The name of the list is LS-ECNEWS. The purpose of the list is to distribute the Engineering and Construction community newsletter, *Engineering and Construction News*.

You can subscribe or unsubscribe to LS-ECNEWS by sending an e-mail message to majordomo@usace.army.mil with no subject line and only a single line of text in the message body. That single line of text should have the following format: **subscribe ls-ecnews** or **unsubscribe**

ls-ecnews. The List Server system will automatically pick up your originating e-mail address from the message and add it to or delete it from the distribution list.

If you have any questions about the list server, see the List Server E-Mail Delivery System web page at http://eml01.usace.army.mil/other/listserv.html. Or you may contact Charles Pearre if you have additional questions on the subscription list.

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